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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,078	10/02/2003	Michio Horiuchi	300.1133	7772

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EXAMINER
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CHUO, TONY SHENG HSIANG

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 03/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/676,078

Applicant(s)

HORIUCHI ET AL.

Examiner

Tony Chuo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☒ Claim(s) 1 and 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/19/05, 10/2/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Objections***

2. Claims 1 and 8 are objected to because of the following informalities: the phrase "mixed fuel gas of fuel gas" should be changed to "mixed fuel gas". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 6, 8, 13, and 16 are rejected because of it's improper use of Markush group. The phrase "selected from a group of" should be changed to "selected from a group consisting of".
5. Regarding claims 1 and 8, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 6-8, 13, 14, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Hibino et al (Journal of Electrochemical Society, pp A133-A136, vol.149). The Hibino reference teaches a fuel cell comprising a solid electrolyte layer of oxygen ion conduction type that is in between a cathode and an anode, an alumina tube that has an inlet port and an exhaust port, an inlet port that supplies a mixed fuel gas to both the cathode and anode to cause an oxidation reduction reaction between the fuel gas and the oxygen by means of the cell element to generate an electromotive force, an anode that is comprised of a NiO cermet that is oxidation resistant against the mixed fuel at the operating temperature of the fuel cell and a metal that is selected from a group consisting of rhodium, palladium, platinum, and ruthenium (See paragraph 2, line 10 to paragraph 4, line 1). In addition, it teaches a metal selected from a group consisting of rhodium, palladium, platinum, and ruthenium that is blended in the anode layer in a range from 0-10 wt% which is in a range from 1 to 50 vol% (See paragraph 3, lines 2-4). Further, it teaches an anode that also comprises 30 wt% samaria doped ceria which is less than 50 vol% (See paragraph 1, line 18 and paragraph 3, line 3). Finally, it teaches a stack of fuel cell elements arranged in the container such that the

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cathode layer and anode layer are parallel to the flowing direction of the mixed fuel gas  
(See Figure 1).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2-4 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hibino et al (Journal of Electrochemical Society, pp A133-A136, vol.149) in view of Munster (GB 1113949). The Hibino reference is applied to claims 1, 6-8, 13, 14, and 17 for reasons stated above. However, the reference does not expressly teach an anode layer that is formed of a fired material comprising NiO with Li added in a range from 1 to 15 mol%. The Munster reference does teach an anode that is formed of a fired material by mixing at least 50 vol% nickel oxide and a lithium carbonate to give a 10 atomic% lithium in the metal species (See page 2, lines 45-46 and 109-118). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hibino fuel cell to include an anode that comprised of a lithiated nickel oxide in order to increase the electrical conductivity of the nickel oxide by several orders of magnitude.

10. Claims 5, 12, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hibino et al (Journal of Electrochemical Society, pp A133-A136,

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vol.149) in view of Badding et al (US 2001/0044043). The Hibino reference is applied to claims 1, 6-8, 13, 14, and 17 for reasons stated above. However, the reference does not expressly teach an oxidation resistant metal that is silver, a stack of fuel cell elements that is arranged in the container such that the cathode layer and anode layer are perpendicular to the flowing direction of the mixed fuel gas, and a cathode, anode, and solid electrolyte layers that are made of a porous material. The Badding reference does teach an oxidation resistant metal that is silver, a stack of fuel cell elements that is arranged in the container such that the cathode layer and anode layer are perpendicular to the flowing direction of the mixed fuel gas, and a cathode, anode, and solid electrolyte layers that are made of a ceramic material which is porous (See Figure 1, paragraphs [0012]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hibino fuel cell to include an anode comprising silver, a cathode and anode layer that are perpendicular to the flowing direction of the mixed fuel gas and a cathode, anode, and solid electrolyte layer that are made of a porous material in order to increase the durability and stability of the electrodes and improve the diffusion of the fuel gas through the electrodes.

11. Claims 15, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hibino et al (Journal of Electrochemical Society, pp A133-A136, vol.149) in view of Horiuchi et al (US 7005207). The Hibino reference is applied to claims 1, 6-8, 13, 14, and 17 for reasons stated above. However, the reference does not expressly teach a container that has first and second spaces in communication with the feed and exhaust ports, first and second spaces that are filled with packing material

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that are formed of powdery particles, porous materials or fine tubes selected from a group consisting of Ti, Cr, Te, Co, Ni, Cu, Al, Mo, Rh, Pd, Ag, W, Pt and Au or an alloy consisting of two or more of them or a ceramic containing one or more selected from a group consisting of Mg, Al, Si, and Zr, and heating means for heating the fuel cell stack and cooling means for cooling the first and second spaces. The Horiuchi reference does teach a container that has first and second spaces in communication with the feed and exhaust ports, first and second spaces that are filled with packing material that are formed of powdery particles, porous materials or fine tubes selected from a group consisting of Ti, Cr, Te, Co, Ni, Cu, Al, Mo, Rh, Pd, Ag, W, Pt and Au or an alloy consisting of two or more of them or a ceramic containing one or more selected from a group consisting of Mg, Al, Si, and Zr, and heating means for heating the fuel cell stack and cooling means for cooling the first and second spaces (See Figure 1, column 2, lines 42-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hibino fuel cell to include first and second spaces in communication with the feed and exhaust ports, first and second spaces that are filled with packing material that are formed of powdery particles, porous materials or fine tubes selected from a group consisting of Ti, Cr, Te, Co, Ni, Cu, Al, Mo, Rh, Pd, Ag, W, Pt and Au or an alloy consisting of two or more of them or a ceramic containing one or more selected from a group consisting of Mg, Al, Si, and Zr, and heating means for heating the fuel cell stack and cooling means for cooling the first and second spaces in order to prevent the fuel gas from igniting even if the fuel gas has an

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oxygen concentration within an ignition limit and to increase the quench diameter of the mixed gas in the spaces.

12. Claims 15, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hibino et al (Journal of Electrochemical Society, pp A133-A136, vol.149) in view of Suganuma et al (EP 1294036). The Hibino reference is applied to claims 1, 6-8, 13, 14, and 17 for reasons stated above. However, the reference does not expressly teach a container that has first and second spaces in communication with the feed and exhaust ports, first and second spaces that are filled with packing material that are formed of powdery particles, porous materials or fine tubes selected from a group consisting of Ti, Cr, Te, Co, Ni, Cu, Al, Mo, Rh, Pd, Ag, W, Pt and Au or an alloy consisting of two or more of them or a ceramic containing one or more selected from a group consisting of Mg, Al, Si, and Zr, and heating means for heating the fuel cell stack and cooling means for cooling the first and second spaces. The Suganuma reference does teach a container that has first and second spaces in communication with the feed and exhaust ports, first and second spaces that are filled with packing material that are formed of powdery particles, porous materials or fine tubes selected from a group consisting of Ti, Cr, Te, Co, Ni, Cu, Al, Mo, Rh, Pd, Ag, W, Pt and Au or an alloy consisting of two or more of them or a ceramic containing one or more selected from a group consisting of Mg, Al, Si, and Zr, and heating means for heating the fuel cell stack and cooling means for cooling the first and second spaces (See Figure 1 & 3, paragraphs [0012],[0020],[0056]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hibino fuel cell



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to include first and second spaces in communication with the feed and exhaust ports, first and second spaces that are filled with packing material that are formed of powdery particles, porous materials or fine tubes selected from a group consisting of Ti, Cr, Te, Co, Ni, Cu, Al, Mo, Rh, Pd, Ag, W, Pt and Au or an alloy consisting of two or more of them or a ceramic containing one or more selected from a group consisting of Mg, Al, Si, and Zr, and heating means for heating the fuel cell stack and cooling means for cooling the first and second spaces in order to prevent the fuel gas from igniting even if the fuel gas has an oxygen concentration within an ignition limit and to increase the quench diameter of the mixed gas in the spaces.

### ***Double Patenting***

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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14. Claims 1, 8, 15-20 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4, 5, 11, 13, and 16 of U.S. Patent No. 7005207 in view of Hibino et al (Journal of Electrochemical Society, pp A133-A136, vol.149). US Patent No. 7005207 teaches a fuel cell comprising a cathode layer, anode layer, solid electrolyte layer, a feed port for supplying a mixed fuel gas, a heater to heat the fuel cell stack, cooling means to cool the space in which the packing materials are filled, packing material that is a powder particle, porous body, small tube made of a metal or ceramic, packing material that is formed of a metal selected from a group consisting of Ti, Cr, Te, Co, Ni, Cu, Al, Mo, Rh, Pd, Ag, W, Pt and Au or an alloy consisting of two or more of them or a ceramic containing one or more selected from a group consisting of Mg, Al, Si, and Zr, fuel cell elements that are parallel to the direction of flow of the mixed fuel gas, fuel cell elements that are perpendicular to the direction of the flow of the mixed fuel gas, and cathode, anode, and electrolyte layers that are porous. However, it does not expressly teach an anode that comprises an oxidation resistant metal and a metal selected from a group consisting of rhodium, platinum, ruthenium, palladium, and iridium. The Hibino reference does teach an anode that comprises an oxidation resistant metal that is NiO and a metal selected from a group consisting of rhodium, platinum, ruthenium, and palladium (See paragraph 3, line 2-4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Horiuchi fuel cell to include an anode that comprises an oxidation resistant metal that is NiO and a metal selected from a group consisting of

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rhodium, platinum, ruthenium, and palladium in order to produce a high performance anode for solid oxide fuel cells.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TK 3/1/06

  
MICHAEL BARR  
SUPERVISORY PATENT EXAMINER